



GLOBAL WIND ENERGY SHIPPING AND LOGISTICS

PHD RESEARCH PROJECT
6TH REFERENCE GROUP MEETING

MARCH 9, 2016 PORT OF ESBJERG, ESBJERG

Proprietary, private, and confidential



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Today's program

12:00-12:30 Working lunch

12:30-14:45 Meeting part I

14:45-15:55 Coffee and meeting (II)

15:55-16:00 Ready for “gå-hjem”

16:00-18:00 “Gå-hjem” meeting

Working lunch



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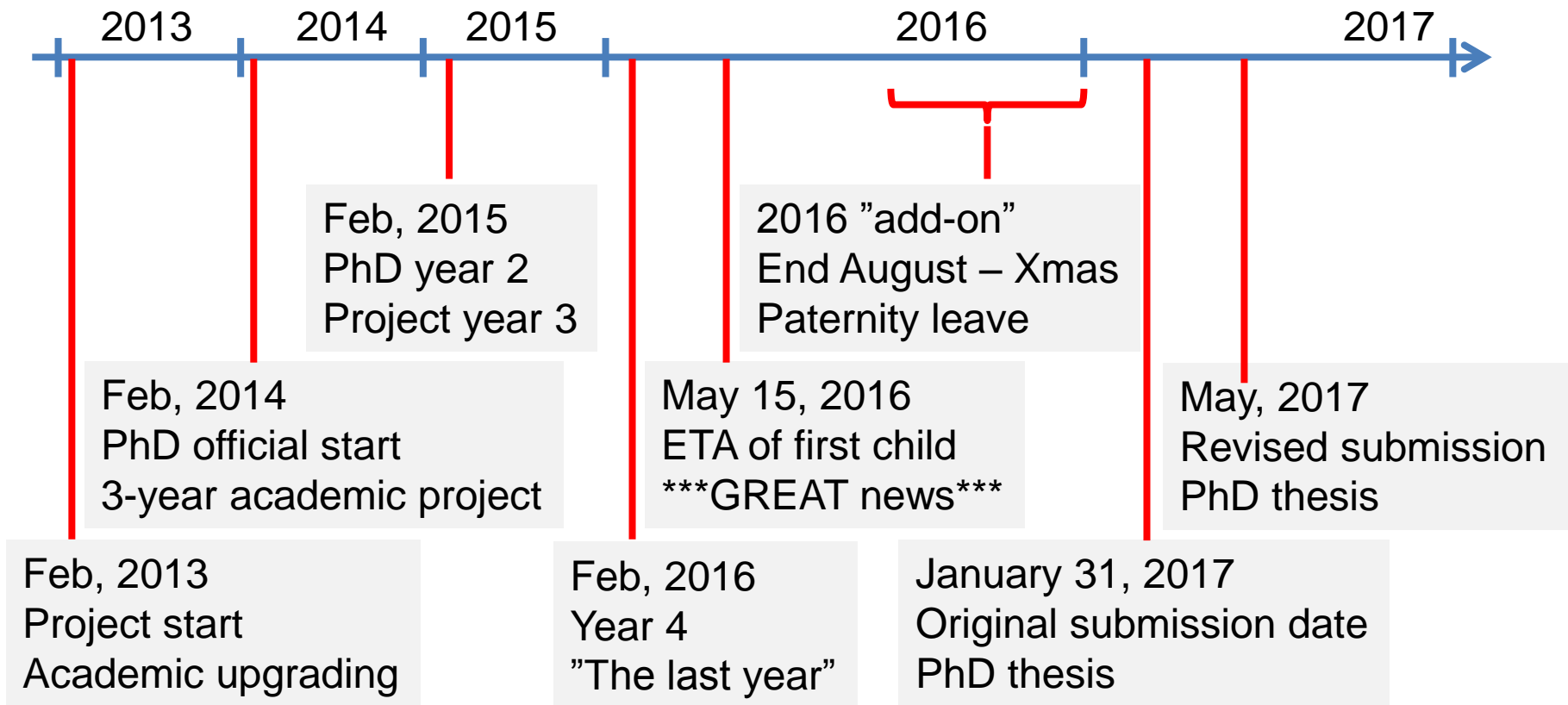
Agenda – Reference Group

1. **Meeting opening**, welcome, and agenda review during working lunch
2. **New/changed Reference Group member organizations** / changed participants – short introduction by new participants
3. **Practical introduction** to logistics operations, maintenance, and repairs
4. **Short review of scoping** of PhD research project efforts from first meetings
5. **Key activities since last meeting**. Focus on:
 - a) The “speed boats” from the PhD “mother vessel”
 - b) Government relations and tailor-made grants (Horizon 2020)
 - c) Concurrent dissemination of research results and findings
6. **Update on academic progress**, 11-month plan, and plans going forward
7. **Wrap-up**, preparation for “gå-hjem” meeting, and date/venue for next meeting

The practical O&M introduction

- Maade – 2x 8MW WTGs incl. O&M
- SubCpartner – O&M with focus on substructures and ROVs
- Esvagt – SOVs for far shore offshore wind farms

Changed PhD planning



Brief introductions

(organizations, participants)



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Intro to new/changed Reference Group participants



- Quick personal background
- Brief overview of the activities of your organization
- Expectations from participation in the Reference Group and research project

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Practical introduction to O&M

(Bus is ready outside)



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The plan

- A quick look at the two new 8 MW WTGs put up at the entry area of the Port of Esbjerg
- Focus on O&M and repairs for BOP
- Far offshore O&M: The SOV

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Around the room

- practical O&M tour feed-back?!



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Scoping from first meetings



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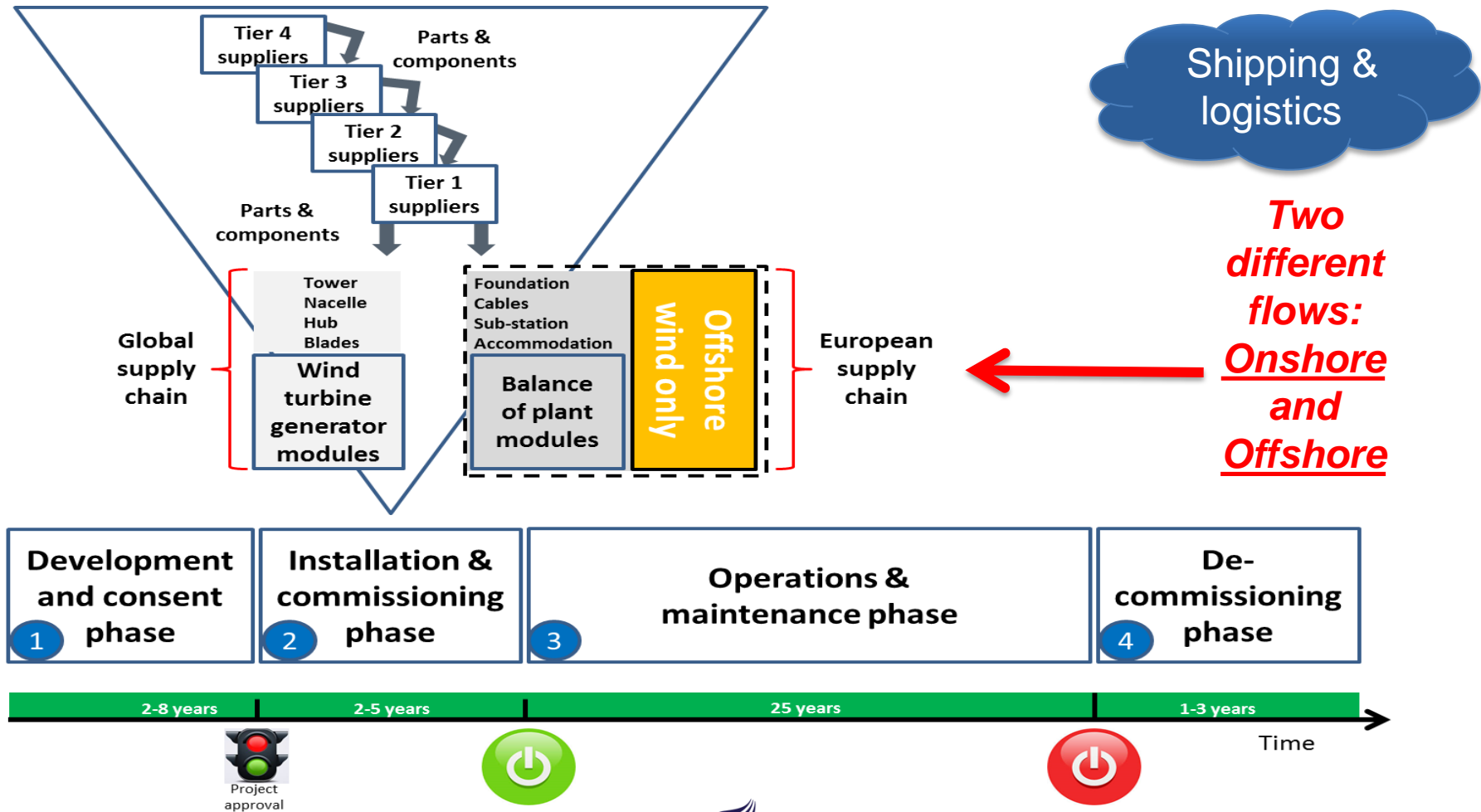
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Charter

The Reference Group will:

- Remain in *active existence* throughout the life-span of the research project
- Convene *twice per year*
- Meetings *at member organization* venues
- *Actively partake* in the research project
- Facilitate the *research project* internally in member organizations, and externally
- Support the on-going *research efforts*

End-to-end life-cycle focus



Shipping, logistics, SCM, end-to-end: *What does it really mean?*

Conclusion:

“The inbound to manufacturing assembly supply chain consists of “standard transportation” mainly by ocean and some air. This part of the end-to-end supply chain was therefore considered less interesting for the project to review than installation & commissioning, operations & maintenance, and decommissioning”

Theory / Practice linkage	Support / Lobby	Challenges /Solutions
Learn biz	Convey info	Practical and relevant / correct
Chinese market network sharing	Investments going forward (vessels, financing, etc.)	Practical background → tools
Reducing LCoE	Project timelines	Academia vs. consulting
Applied research	Offshore wind knowledge	Capture change
Good quality research	Case studies	Look at change in future
Scope: Narrow, realistic, big, complex, crystalize, etc.	Continuous “smart” goals: Concrete, specific, look ahead, value	Moving research target (in time)
On-time project	E2E wind supply chain	Bridge more industries

Case study efforts

Number of companies

Time spent

Extent of case study scope

Depth

Width

Europe

Offshore, simple and easy cases

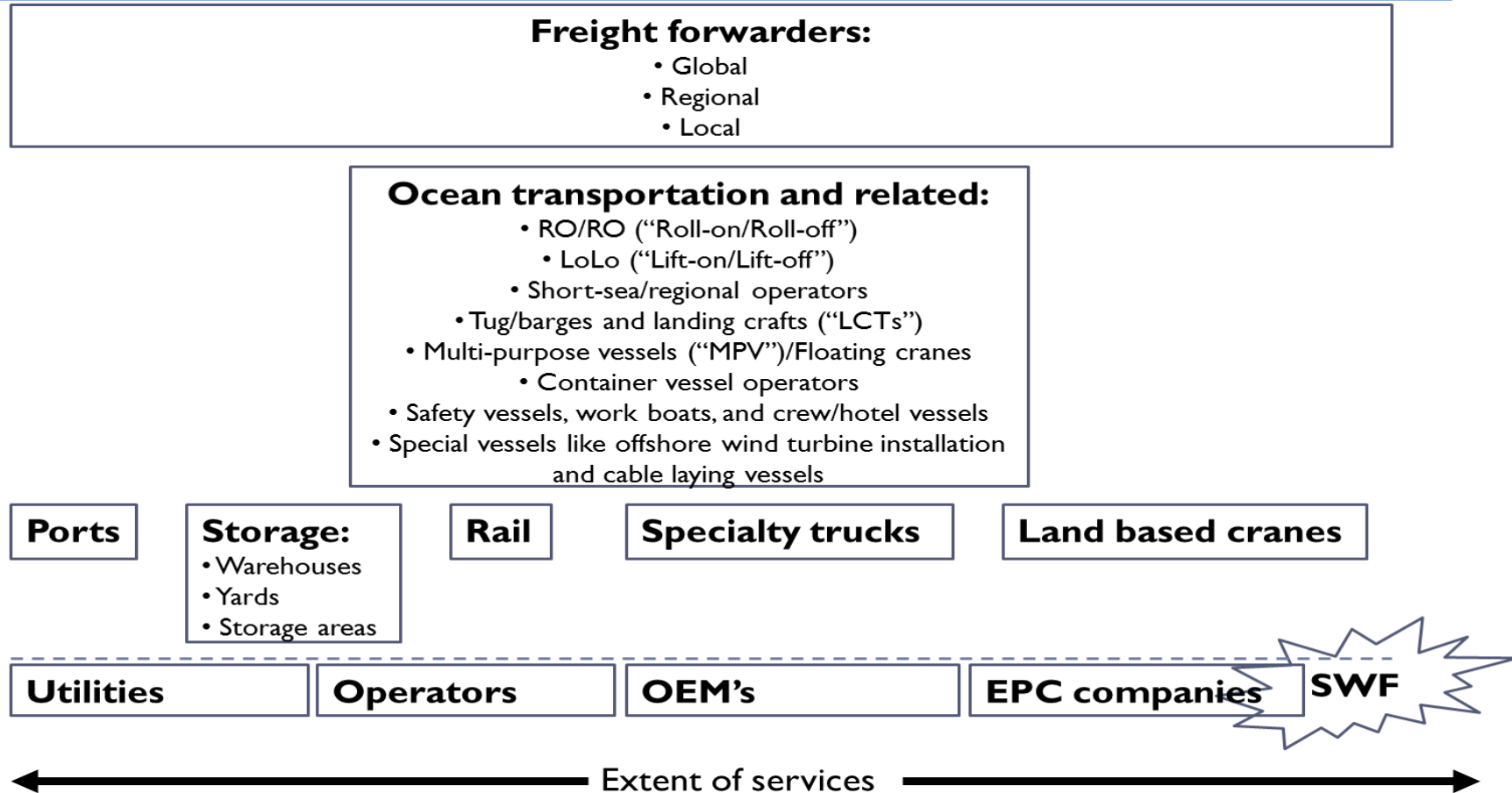
Asia

Offshore, one case

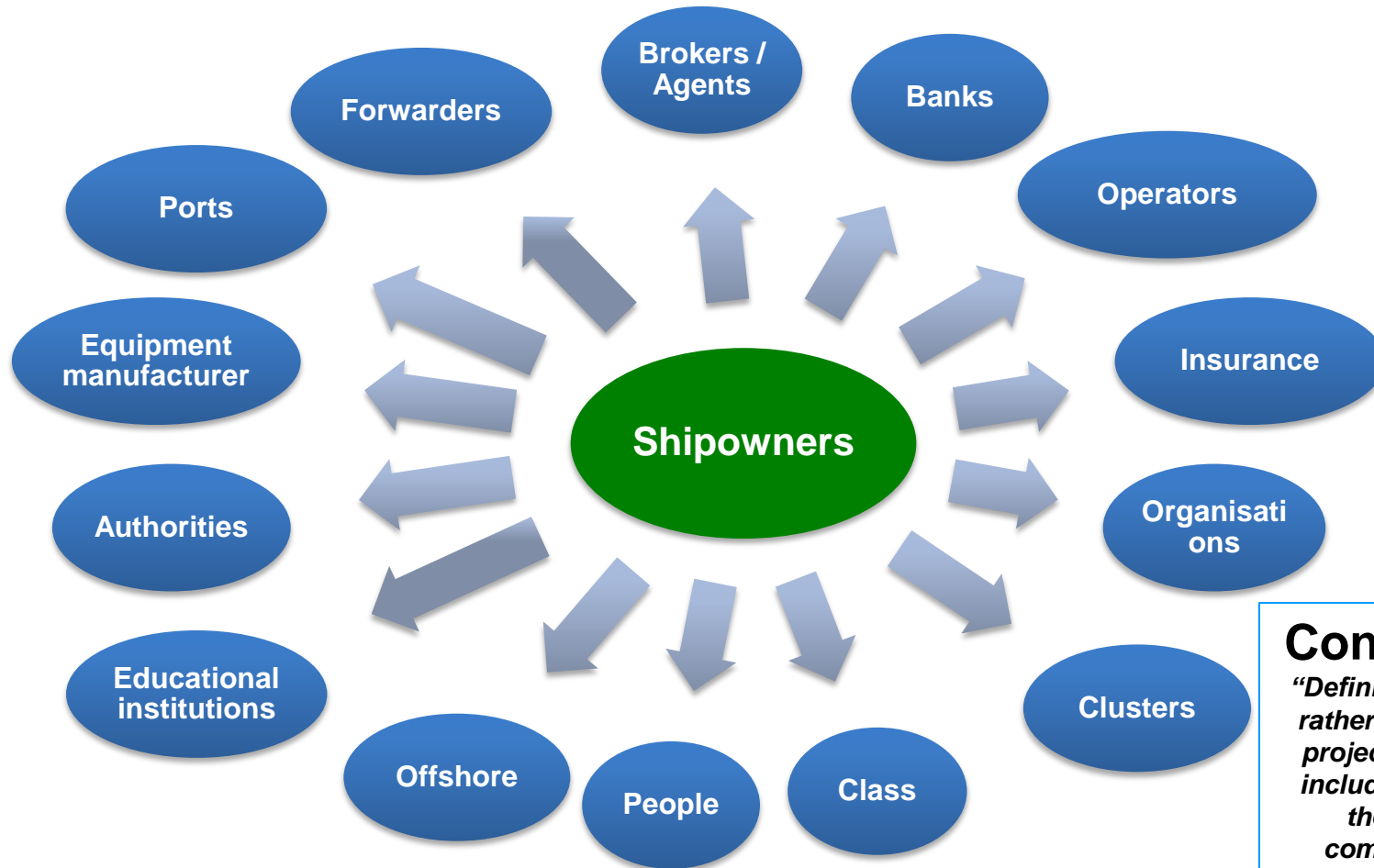
Americas

Onshore, rail focus

Wind energy shipping and logistics: Involved parties...



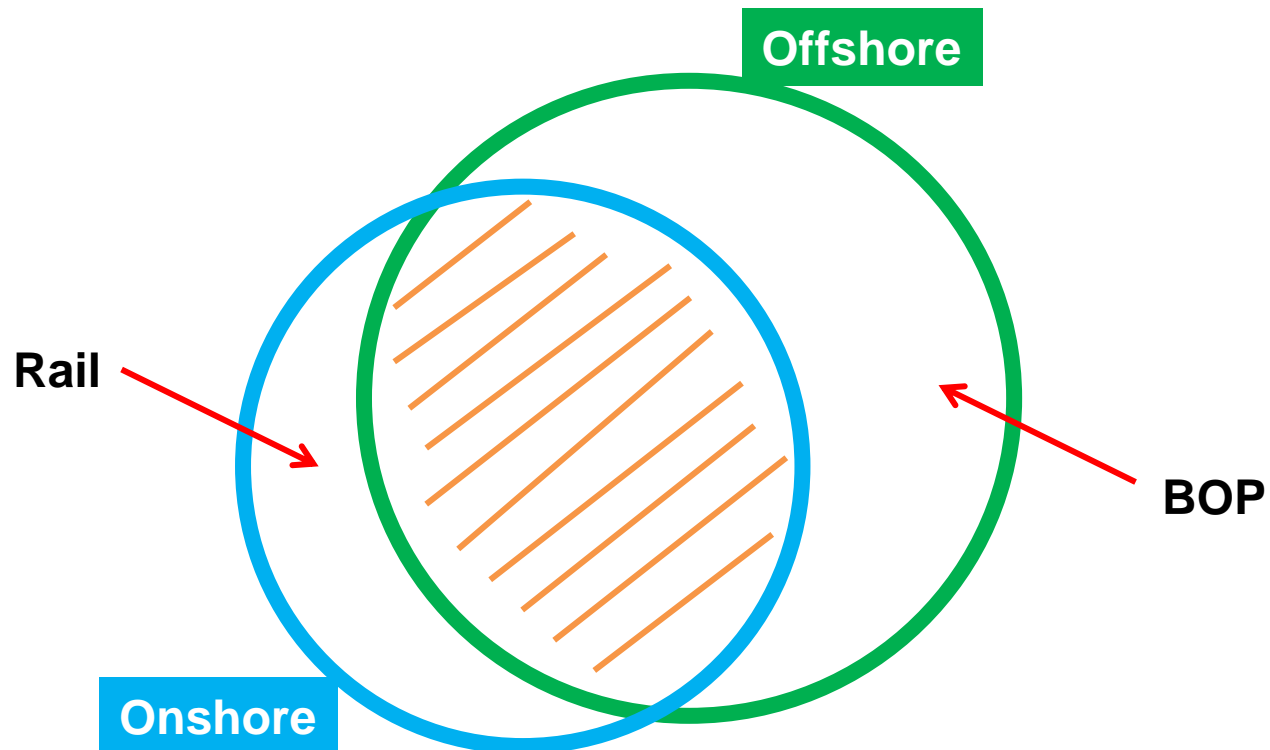
Definition of “The blue Denmark”



Conclusion:

“Definition should be rather broad for this project and not just include for example the shipping companies/DSA members”

Onshore and offshore SCM



Onshore and offshore wind – Differences and similarities

Conclusion:

“Whereas both similarities and differences exist between the onshore and offshore wind farm supply chains, the offshore wind supply chain is more complex in terms of shipping and logistics”

Similarities	Differences
Inland: <ul style="list-style-type: none">- Same trucks / Equipment- Daytime- Infrastructure	Sea carriage: <ul style="list-style-type: none">- Assembly to site (outbound)
Port storage: <ul style="list-style-type: none">- Temp. storage	Infrastructure: <ul style="list-style-type: none">- Quayside loading / logistics- Diff. equipment (vertical)- Area / space (buffer)- Seamen education (outbound)- BOP- Installation / equipment / skills
Actual maintenance	Maintenance <ul style="list-style-type: none">- Certificates- Transportation- Equipment

Scoping of the Ph.d. research

First Reference Group meeting scoping conclusion:

Wind energy supply chains						
Wind farm phase	<i>Development & Consent (D&C)</i>	<i>Installation & Commissioning (I&C)</i>		<i>Operations & Maintenance (O&M)</i>		<i>De-commissioning (De-comm)</i>
Supply chains	D&C chain	I&C chain - Inbound	I&C chain - Outbound	O&M - Preventive	O&M - Breakdown	De-comm chain
Description	Site surveys, birds, wildlife, sea, seabed	Inbound assembly parts and components	Outbound wind modules for wind farm site	Personnel, parts, and components	Personnel, parts, components, and modules	Restoration of site for new wind farm or to original condition
Characteristics	Specialized vehicles (onshore) and vessels (offshore)	Mainly a homogenous flow using ocean containers and air; some project cargo	Project cargo/break-bulk	Mainly service boats, crew transfer vessels and some larger vessels	Service boats and helicopters, some large vessels like MPV, tug&barge, WTIV	Project cargo/break-bulk

Assumed to have the largest possible impact on potential reductions of levelized cost of energy



Achievements since last meeting



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Speed boats - CRF

Offshoreenergy.dk “Cost Reduction Forum”

- Group 4 logistics O&M
 - Part I finalized and part II started up
 - 5 areas for cost savings identified
 - Process defined and 1 area selected for journal paper writing
- Group 3 INNOlog kicked off
 - Similar scope as PhD research project

Speed boats – RM5 Logistics

DONG Energy Wind Power logistics
R&D RM5 Logistics strategy project

- Strategy proposal submitted to DONG Energy July 22, 2015
- DONG Energy RM5 Logistics Reference Group review September 7, 2015
- Journal paper written and under review for approval by DONG Energy

Speed boats – China OW

Offshoreenergy.dk China delegation trip
October, 2015 offshore wind

- Preparation trip in July, 2015
- Delegation trip October 13-23, 2015:
 - Visits to Beijing, Tianjin, Shanghai, and Jiangsu
 - China Wind Power conference
 - Meetings and dating events with supply chain constituencies
 - Site visits to factories and ports
 - Visit to Rudong offshore test wind farm
- About 50 delegates in total



Mid-term PhD conference

Mid-term PhD project status briefing:

- Part of the overall milestones agreed with DDMF
- Conducted as part of Danish Maritime Days 2016 (sponsored by DDMF)
- Included an industry expert panel and PhD results to balance the day
- Findings of PhD research project disseminated to academia and industry practitioners alike
- Nice show of people and good discussions

Mid-term: The setting

1. OPENING

Morten Basse Jensen, CEO, Offshoreenergy.dk



Moderator

2. PANEL DISCUSSION

RISK AND RISK MITIGATION

Special focus - Offshore wind shipping and logistics risk management

SAFETY OF PERSONNEL IN THE O&M/SERVICE PHASE

by Anders Boman



SAFETY CONSIDERATIONS FOR TRANSPORT DURING CONSTRUCTION

by Carsten Agerbæk

Turnkey Logistics 

INSURANCE AND RISK MITIGATION FOR SHIPPING AND LOGISTICS

by Anders Bek



External speakers

3. MID-TERM UPDATE

GLOBAL WIND ENERGY SHIPPING AND LOGISTICS PHD RESEARCH PROJECT

by Thomas Poulsen



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Mid-term: The focus

Key topics discussed:

- PhD research project infrastructure
- Update on status of findings for the 3 research questions with 5 layers
- Research findings so far:
 - Conference papers 1+2: Industry challenges and life-cycle with Anholt test
 - Peer reviewed book chapter: Global wind shipping/logistics, business model, M&A
 - On-going cases: RM5 Logistics, CRF, China)

Government relations - and tailormade grants



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EU Commission lobbying

March 2015 Reference Group success:

- Meeting with EU Commission officials
March 3, 2015 in Brussels



- Meeting with EU Commission officials at
EWEA Offshore March 11, 2015 in
Copenhagen

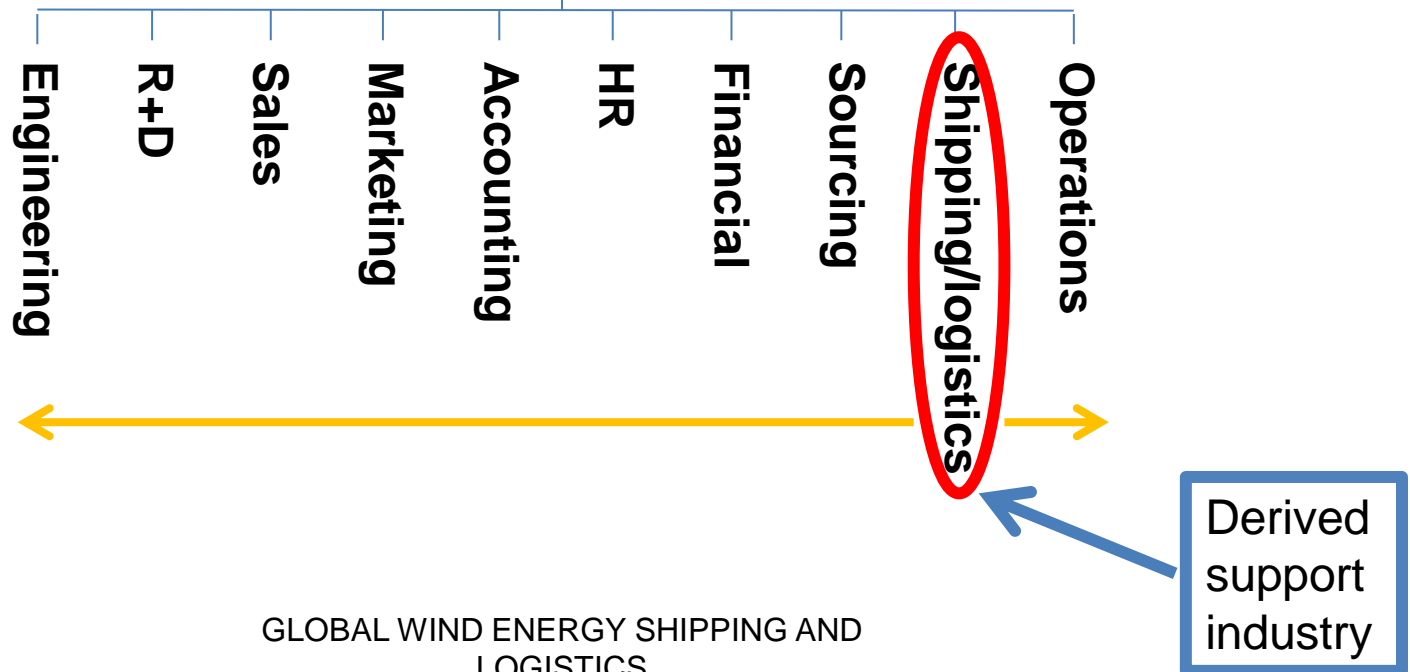


EU argument: Derived market

Government induced demand

Wind industry

Firm functions



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Government relations - EU

EU Commission H2020 WP Energy 2016-2017 lobbying status:

- Logistics and shipping text successfully inserted
- 2 separate low carbon energy calls about wind energy
 - ✓ **LCE 13 – 2016**: Solutions for reduced maintenance, increased reliability and extended life-time of wind turbines/farms (grant size **EUR 7-10 million**)
 - ✓ **LCE 14 – 2017**: Demonstration of large >10MW wind turbine (grant size **EUR 20-25 million**)

Industry driven - huge success!

Dissemination of research results and findings



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Concurrent dissemination

Academic

- Mid-term seminar, October, 2015
- OEDK BSR China fact-finding trip, October, 2015
- Academic papers:
 - Paper on supply chain readiness
 - Paper on RM5 Logistics case study

Industry

- Sino-Danish wind seminar, October, 2015
- HubNorth Aalborg conference November, 2015
- Baltic Sea Rønne offshore wind conference, January, 2016

Academic update

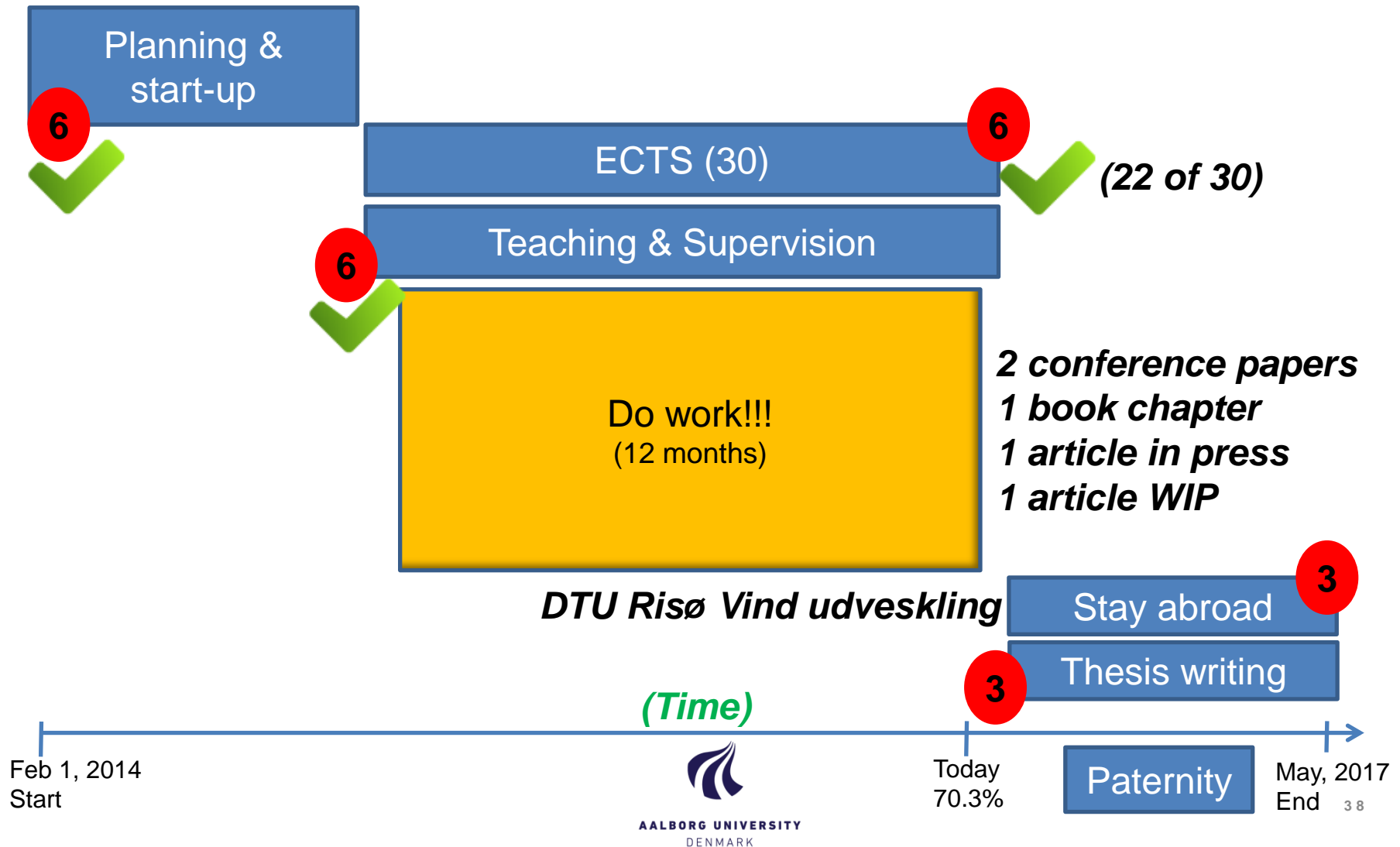


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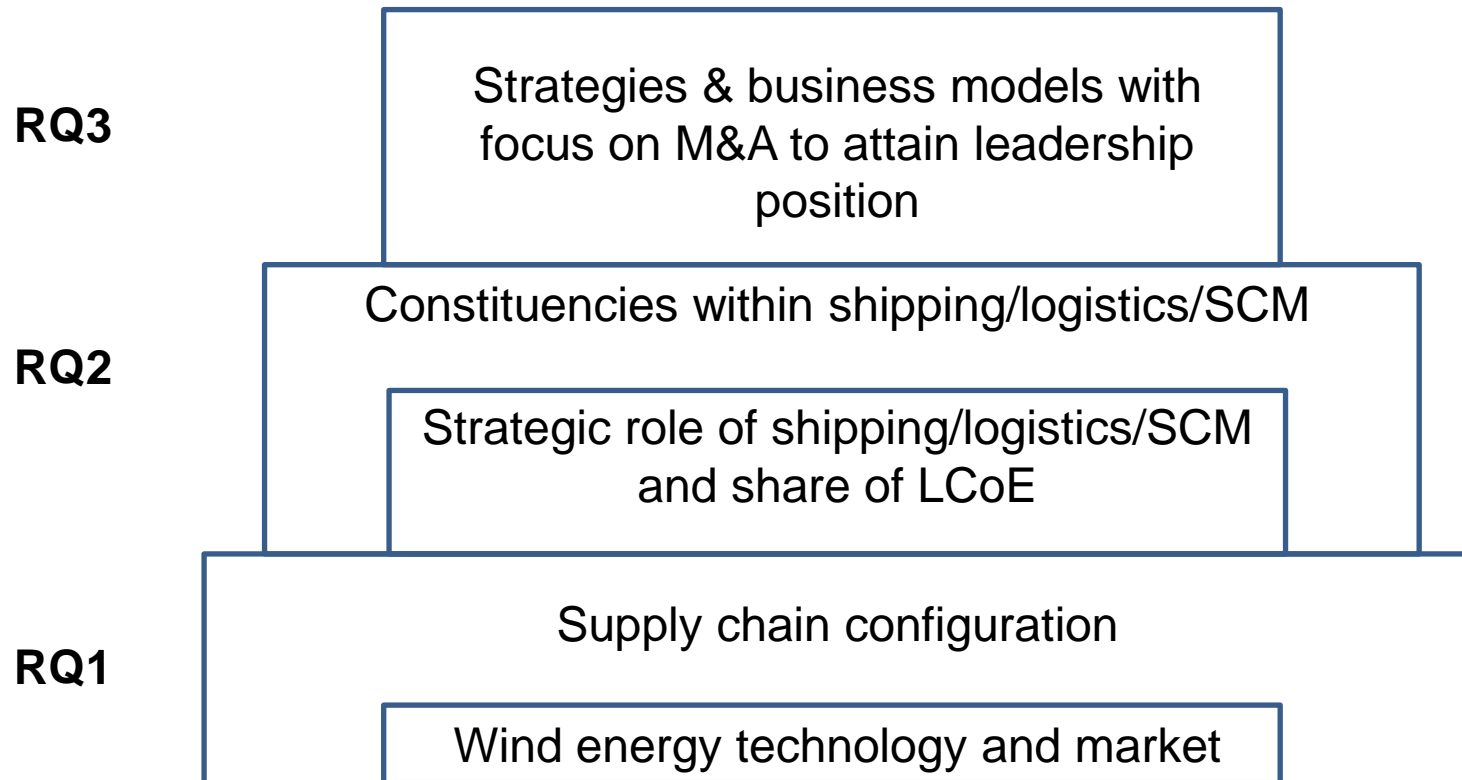


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Time blocks of Ph.d. (3 years)



Tiered research questions



Final thesis ToC

- Summary
- Introduction and background
 - ✓ Status of knowledge indicating scientific context
- Theoretical framework
 - ✓ Different per article
- Methodology
 - ✓ Flyvbjerg on misunderstandings about case studies

Final thesis ToC (cont)

- Short summary of each article
 - ✓ Incl. "rød tråd" and rationale/"fit"
- Results seen as a whole
 - ✓ Across individual journal articles
 - ✓ Compared to the 3 research questions (5 tiers)
- Conclusion
- References

Wrap-up and close



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Closing of today

- Date for next meeting
- Hosting company
- City

✓Wrap-up

Next Reference Group meeting

Date suggestion: August, 2016

Any volunteers?

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Transfer to gå-hjem

***Now let us proceed to the
gå-hjem meeting / "go-home"
after work meeting***